

We claim

1. A process for preparing phthalic anhydride by catalytic
5 gas-phase oxidation of xylene and/or naphthalene by a gas
comprising molecular oxygen in a fixed bed at elevated
temperature and using at least three coated catalysts
arranged in superposed zones, which catalysts have a layer of
10 catalytically active metal oxides applied to a core of
support material, wherein the catalyst activity rises from
zone to zone from the gas inlet end to the gas outlet end and
the activity of the catalysts of the individual zones is set
such that the least active catalyst comprises a lower amount
15 of active composition and, if desired, additionally more
alkali metal selected from the group consisting of potassium,
rubidium and cesium as dopant than the catalyst of the next
zone and the subsequent even more active catalyst comprises
the same amount of active composition and even less alkali
20 metal as dopant or a greater amount of active composition
and, if desired, less alkali metal as dopant than the
catalyst of the second zone, with the proviso that
 - a) the least active catalyst on nonporous support material
25 comprises from 5 to 9% by weight, based on the total
catalyst, of active composition comprising from 3 to 8%
by weight of V_2O_5 , from 0 to 3.5% by weight of Sb_2O_3 , from
0 to 0.3% by weight of P, from 0.1 to 0.5% by weight of
alkali metal (calculated as metal) and as balance TiO_2 in
anatase form having a BET surface area of from 18 to
30 $22\text{ m}^2/\text{g}$,
 - b) the next more active catalyst has the same composition as
catalyst (a) except for an active composition content
which is from 1 to 5% by weight (absolute) higher and an
35 alkali metal content which is from 0 to 0.25% by weight
(absolute) lower and
 - c) the most active catalyst has the same composition as (a)
except for an active composition content which is from 1
40 to 5% by weight (absolute) higher than in (a) and an
alkali metal content which is from 0.15 to 0.4% by weight
(absolute) lower than in (a).
2. A process as claimed in claim 1, wherein cesium is used in
45 amounts of from 0.25 to 0.5% by weight as alkali metal in the
least active catalyst.

3. A process as claimed in claim 1, wherein the activity of the individual catalysts is set such that the most active catalyst comprises the same amount or a greater amount of active composition and less alkali metal as dopant than the catalyst of the second zone.
4. A process as claimed in claim 1, wherein the activity of the individual catalysts is set such that the catalyst of the second zone comprises a greater amount of active composition and less alkali metal as dopant than the catalyst of the first zone.
5. A process as claimed in claim 1, wherein the activity of the individual catalysts is set such that the catalyst of the second zone comprises the same amount of active composition and more alkali metal as dopant than the most active catalyst.
6. A process as claimed in claim 1, wherein the catalyst (a) has an active composition content of from 6 to 8% by weight comprising from 4 to 8% by weight of V_2O_5 and from 0.3 to 0.5% by weight of Cs (calculated as Cs), the catalyst (b) has an active composition content of from 8 to 12% by weight comprising from 0.2 to 0.5% by weight of Cs and the catalyst (c) has an active composition content of from 8 to 12% by weight comprising from 0 to 0.3% by weight of Cs.
7. A process as claimed in claim 1, wherein the catalyst (a) has an active composition content of from 7 to 8% by weight comprising from 6 to 8% by weight of V_2O_5 and from 0.3 to 0.4% by weight of Cs, the catalyst (b) has an active composition content of from 9 to 11% by weight comprising from 0.2 to 0.4% by weight of Cs and the catalyst (c) has an active composition content of from 9 to 11% by weight comprising from 0.05 to 0.2% by weight of Cs.